Israeli Artillery Tactics and Weapons— Lessons Learned in Combat

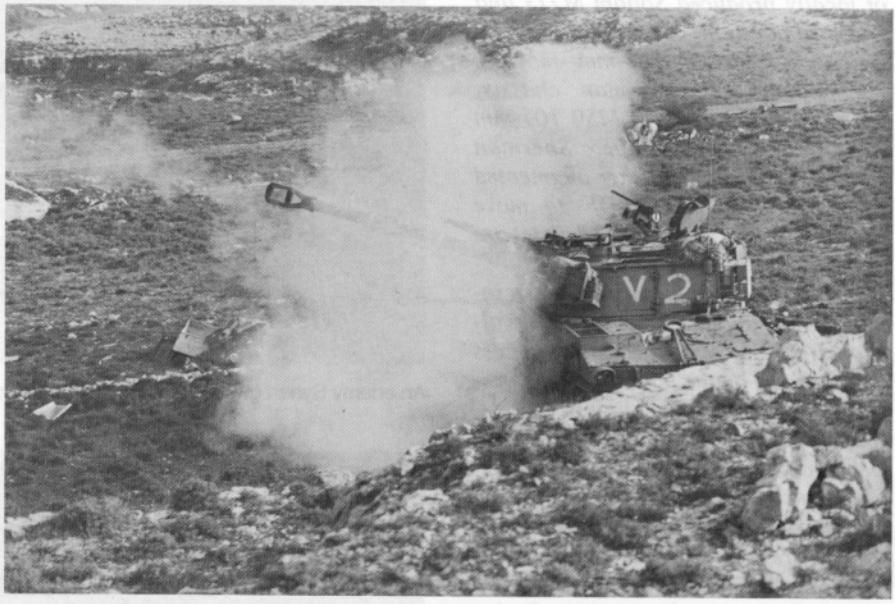
by Brigadier General (Reserves) Arie Mizrachi, IDF

Firepower played a major role in the 1982 Lebanon War. This War, one of many in the long and continuous conflicts of the Middle-East, was in fact, "The Artillery War." The "secret" of the Israel Defence Forces (IDF) artillery's success rested in the correct combination of new tactics that had emerged from the lessons of the 1973 Yom Kippur War and modern, locally developed weapon systems.

Characteristics of the Lebanon War

The 1982 confrontation was the first war in which the IDF had employed large quantities of the M109A1 and A2 self-propelled howitzers (SPHs). The main portion of the divisional artillery's combat equipment was based on those M109 SPHs and the M107 175-mm guns, which were converted, in certain cases, into 8-inch tubes. The IDF also used rocket artillery in the form of the medium artillery rocket (MAR) 290.

As far as I am aware, this was the first war in which each battery had an integral battery computer system. Our forward observers (FOs) at all levels used laser range finders (LRF) while remotely piloted vehicles (RPVs) were used for target acquisition, fire control and damage assessment. Our Smart fire control radar, still in its prototype version at the time, also was successfully used for registration missions.



The M109, firing in Lebanon, is deployed in accordance with terrain features.

The 1982 War was, in fact, the first in history where 155-mm improved conventional munitions (ICMs) coupled with rocket artillery were used widely. This had a tremendous "impact" on the enemy, affecting his armor, infantry, artillery batteries and built-up areas. Direct-fire techniques, implemented by the M109s and the 8-inch tubes against pinpoint targets, also proved very effective.

The well-known American military historian, Richard A. Gabriel in his book, *Operation Peace for Galilee—The Israeli-PLO War in Lebanon* (Hill and Wang, New York, 1984), described the role of the IDF artillery during the 1982 Lebanon War, as follows:

Artillery is the newest combat arm of the IDF, created out of whole cloth after the 1973 War. In 1973, the IDF had about 300 artillery guns, most of which

were towed pieces. By 1982, the number of guns had increased to more than 958, most of which were self-propelled, large-caliber artillery.

Prior to 1973, artillery played essentially a support role, with limited mobility in support of the tank. Today [1984] IDF artillery is completely mobile to keep up with the rapid advance of tanks and armored personnel carriers; it has become a full partner in the combined-arms team.

Its weaponry is comprised mostly of M109s and M107s, added to a number of locally produced Soltam M71s and L33s. In addition, it deploys a considerable number of 160-mm mortars mounted on old Sherman chassis, as well as a number of M50 105-mm guns mounted on Super Sherman chassis. Mobility is further augmented by the ability of the IDF to move artillery pieces to the battlefront on transporters.

Artillery proved effective in most instances during the Lebanon War, although to some extent its effectiveness was reduced by the terrain, which prevented its playing the highly mobile, fast-moving role envisioned for it in the new combined-arms doctrine developed since 1973. Operations were often slowed to a crawl by terrain and hostile fire in urban areas.

In the east, artillery proved effective in counterbattery fire against Syrian positions, a fact helped considerably by the Syrians' refusal to redeploy artillery rapidly with the changing tactical situation. The effectiveness of artillery in the eastern zone also was increased considerably by the Israelis' complete air superiority.

In the west, the effectiveness of artillery was reduced by self-imposed restrictions to limit property damage and civilian casualties. However, the artillery was technically very good. It made good use of new devices such as the RPVs…[and] intelligence gathered by aircraft flying over the battlefield.

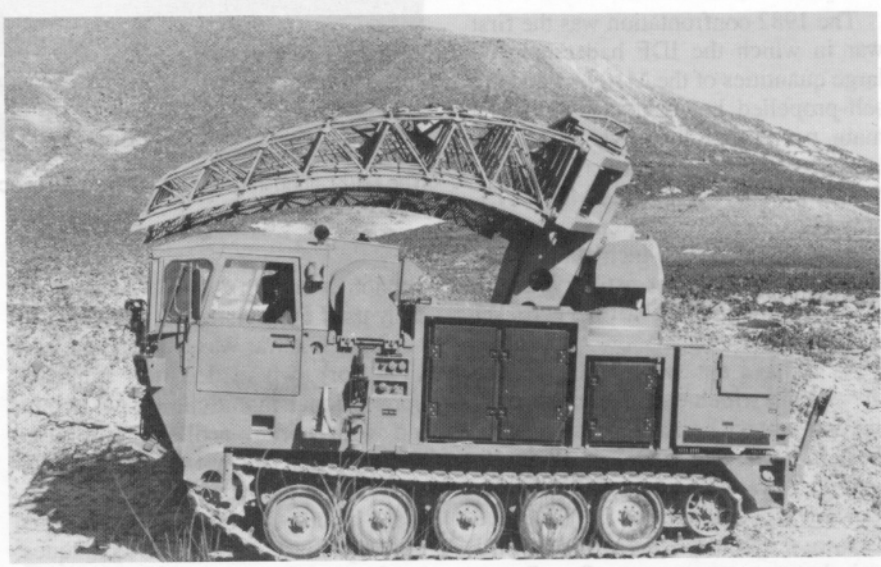
In addition, it used the new Rafael David fire-control computer system (made in Israel), which made it fairly effective at sheaving artillery and linking concentrated fires. It also deployed a number of new fire modes built around the new Telkoor M131 multi-option fuse.

In Beirut, the artillery played a crucial role in suppressing enemy fire and destroying PLO strongpoints within the camps and the city. Often, in responding to PLO Katyusha and mortar fire, the IDF was able to sheave its artillery rapidly and respond almost immediately by pouring scores of shells on a single area….During the siege of Beirut, the IDF seems to have discovered the technique of "sniping" with large-caliber artillery pieces by firing single rounds into PLO military targets at point-blank range.

Artillery performed well in Lebanon with no major problems. However, battle conditions presented it with considerable advantages that it may not have on a different battlefield in the future. The conditions of battle in Lebanon did not allow for a true test of the artillery and structure envisioned in 1973. Its new role was to deploy in support of rapidly moving armored infantry forces in a closely coordinated combined-arms attack. A test of that role will have to wait for the future.

Many subjects regarding the performance of the artillery in 1982 would interest American Redlegs. However in

An enemy Syrian gun sits damaged after being hit by Israeli artillery in Lebanon.



Smart Antenna Vehicle. The Smart fire-control radar proved to be a significant force multiplier during the War in Lebanon.

this article, I'll concentrate on three significant issues: direct fire for self defence, battery deployment and survivability and large concentrations of fires.

Direct Fire for Self Defence

In the 1973 War, the IDF had only 23 short-barrel M109 SPHs. I was serving as an M109 battalion commander in the Golan Heights, and one of my batteries (Battery B) was deployed in the southern part of the Golan—right on the main axis of the Syrian armor penetration route.

That place, known as the Tel-Fares Gap, was defended by an Israeli armored brigade that had already faced two Syrian divisions. The artillery ratio was 15:1, with our being greatly outnumbered by the Syrians.

In the first seven hours, from 1400 until about 2100, Battery B fired more than 1,000 rounds on various targets. In the evening, a Syrian T-55 tank company attacked it from a range of about 40 meters. Three of our four howitzers were destroyed and so was the M113 fire direction center (FDC).

The immediate lesson we learned from that battle was we urgently needed to improve the ability of our crews to defend themselves. We increased our survivability by better using the section's main weapon—the howitzer—for defence purposes.

To fulfill such an objective, we developed direct-fire techniques dealing with such issues as fighting enemy tanks at various ranges, maximizing the duration of our stay in firing positions and commanding and controlling battery fire. We also developed a new 3,000-meter telescope capable of firing with a charge 9 propellant (US—203).

From 1976 to 1982, we dedicated a large percentage of our training time and ammunition to direct-fire drills. To encourage our crews, we even conducted some tests on the effects of 155-mm fire against T-62 tanks.

The results of these technique, tactic and training efforts were indeed apparent in the Lebanon War. We used M109A2 and 8-inch M110 battalions very effectively in direct-fire missions. It was natural for our crews to use direct fire whenever needed—for battery self defence as well as against strongholds, and particularly in built-up areas.

Better Deployment and Survivability

At the start of the 1973 Yom Kippur War in the Golan Heights, the Israeli artillery was heavily outnumbered (15:1) by the Syrian artillery forces. The ratio improved to 7:1 after we mobilized our reserve forces, a ratio we maintained throughout the 1974 War of Attrition (which has the same name as the 1970 War) in the Golan Heights. The name of the game was, thus, ***survivability.***

During the 1974 War of Attrition, my Battery C was deployed near the forward edge of the battle area (FEBA) approximately 35 kilometers from Damascus in an area that had been captured from the Syrians in 1973.

The entire area had been well observed by the Syrian forces situated on the highlands, and "Shoot and Scoot" tactics were not effective. The enemy forces would accompany our leapfrogging with counterbattery fires and make sure that such fires would "welcome" us in our new positions. Because our mission was to provide close support for our front-line forces, we had no choice but to remain in the same positions and keep on firing.

The Battery Commander devised a way to increase our survivability by deploying his SPHs in deserted Syrian trenches with the hulls and turrets almost concealed. For each SPH, the tube was practically the only part that wasn't in the trench, allowing us to fire full-circle (360 degrees).

We solved the ammunition supply problem by converting one of the howitzers into a Field Artillery ammunition support vehicle (FAASV). We also put 70 to 80 rounds on the floor of each SPH.

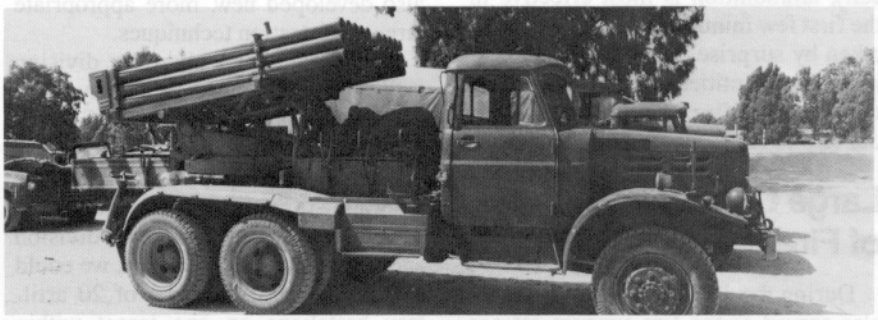
The M109, thus, was completely shut, using distant reference points instead of aiming rods. All the crew members wore armored vests. The Battery remained in the same position for three weeks, continuously providing effective fire support with no casualties during that period.

The outcomes of this lesson were two—we changed our tactics and improved our howitzers.

New Tactics

We began using new deployment techniques that came to be known as "deployment in accordance with terrain features." We taught our section chiefs to exercise independence in the selection of their positions. The battery deployment area covered some 400 to 600 meters, with each section chief's having to find his own trench, cover and concealment. We deployed the M109 with all hatches shut and all activities and procedures carried out from within the crew compartment.

Used in Lebanon, the Israelis developed the MT 18/19 laser range finder for both forward and firing echelons.



The Palestine Liberation Organization used this Soviet-made Katyusha rocket launcher in Lebanon.

The data from the FDC were sent separately to each specific gun, due to the different muzzle velocities (MVs), and was computed by the battery computer, which included the different gun positions in its computations. We thus enhanced survivability by taking advantage of the capabilities of the M109 and battery computer.

Howitzer Improvements

Artillery movement necessarily results in the reduction of artillery fire support to front-line units and implies greater danger for the latter. But to enable our crews to follow the new tactics, we had to further reduce our vulnerabilities. We had to give them a system that would increase survivability and allow our artillery to accomplish its mission successfully.

An improved weapon system had to allow us to remain in one firing position with hatches shut and receive all needed data digitally from the FDC while the SPH provided the navigation and laying data. The improved system also had to—

- Increase the quantity of on-board ammunition, allowing crew members to remain in the crew compartment throughout the firing process.
- Improve the rate of fire and reduce the time it takes to shift from one target to the next, allowing us to engage the large number of targets we faced as we were severely outnumbered.

One should remember that, statistically, ammunition is most effective in the first few minutes while the enemy is taken by surprise. This entails our firing large quantities in a short time and requires significant improvements in our rate of fire.

Large Concentrations of Fires

During the 1973 Yom Kippur War, I also served as the fire support officer (FSO) of the 7th Armored Brigade in the Golan Heights. One of the most severe problems we encountered in the defence was the ratio between enemy tank quantities and our own.

On the most crucial day of battle, we were at a quantitative disadvantage of 150 enemy tanks to our 10, which at that time were still undamaged. The enemy tanks had assaulted us in a final attempt to break through our defence line.

Our solution was to concentrate the fires of 21 artillery batteries, which were at my disposal at the time, together with the fires of an additional artillery 240-mm rocket battalion. The shock created by such a massive concentration of fires—especially the distressing effect the 144 240-mm rockets caused on enemy morale—forced some of the enemy units to stop and the rest to at least slow their progress. We gained much-needed time that allowed our tanks to reach their positions and receive reinforcements. The enemy withdrew and the battle was decided.

As a result of that battle, we better understood the importance of firing accurately and taking the enemy by surprise to cause maximum damage. We also developed new, more appropriate target registration techniques.

These techniques allow the division artillery the maximum flexibility when concentrating fires. We simplified the techniques by using the battery fire computer, which quickly and automatically adjusts the fires of a single gun, to adjust the fires of the entire division artillery. In the Lebanon War, we could concentrate the firepower of 20 artillery battalions on one target within minutes, without having to adjust.

One of the Israelis' locally developed systems is their version of a position and azimuth determining system (PADS).

The device we developed for this purpose is the Smart system. Smart is a fire-control radar system whose range allows us to use it far behind firing artillery pieces. Smart's range and accuracy proved to be remarkable, exceeding our expectations. This radar enabled us to concentrate fires and exploit artillery flexibility in both mountainous and built-up areas.

Summary

The lessons of the 1973 War emerged into operational requirements, which led to our developing new tactics, techniques and weapon systems to accommodate those requirements. By 1982, the IDF artillery could exploit its potential fully and became a decisive arm on the battlefield.

Brigadier General (Reserves) Arie Mizrachi is President of a consulting firm he started in Ganei Tiqva, Israel. He spent 24 years in the Israel Defence Forces and was Chief Artillery Officer when he was released in 1983. General Mizrachi's combat experience includes serving as a combat officer (S3) and battery commander during the Six-Day War (1967), as a battery commander and deputy battalion commander in the War of Attrition (1970), as battalion commander and armoured brigade commander for fire support in the Yom Kippur War (1973) and as Artillery Corps Commander in the Lebanese War (1982). He also served as Artillery Commander of the Israeli Northern Command and as the Commanding Officer of the IDF Artillery School. General Mizrachi is an honor graduate of the US Army Field Artillery Officer Advanced Course (1975), Fort Sill, Oklahoma.